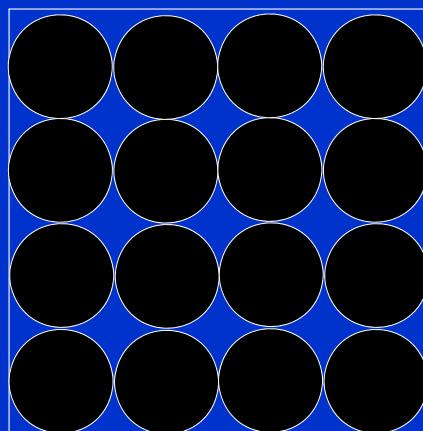
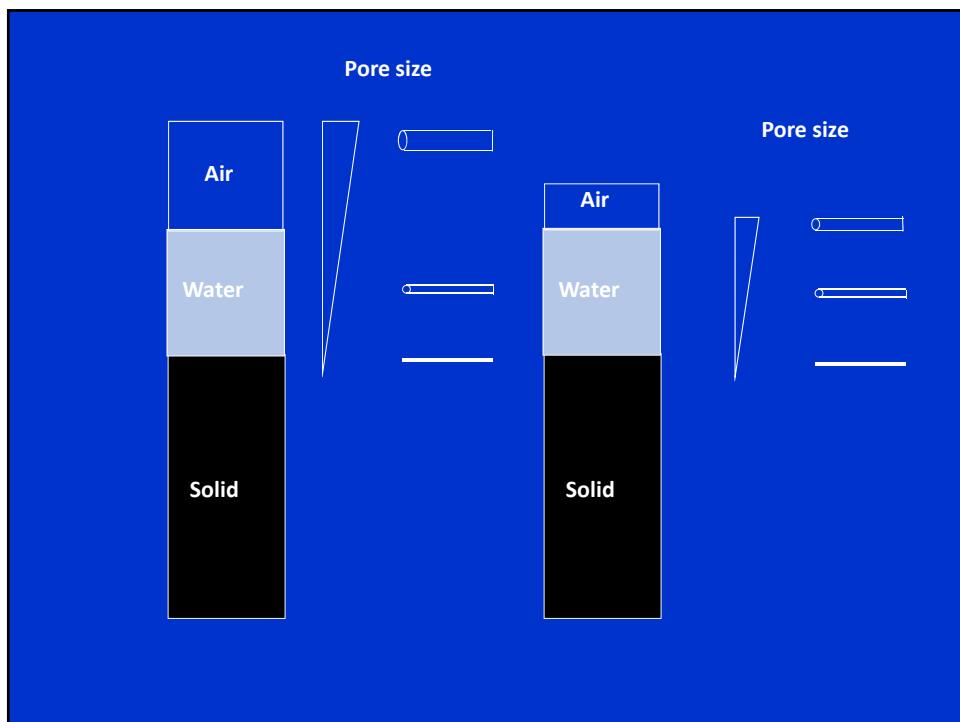
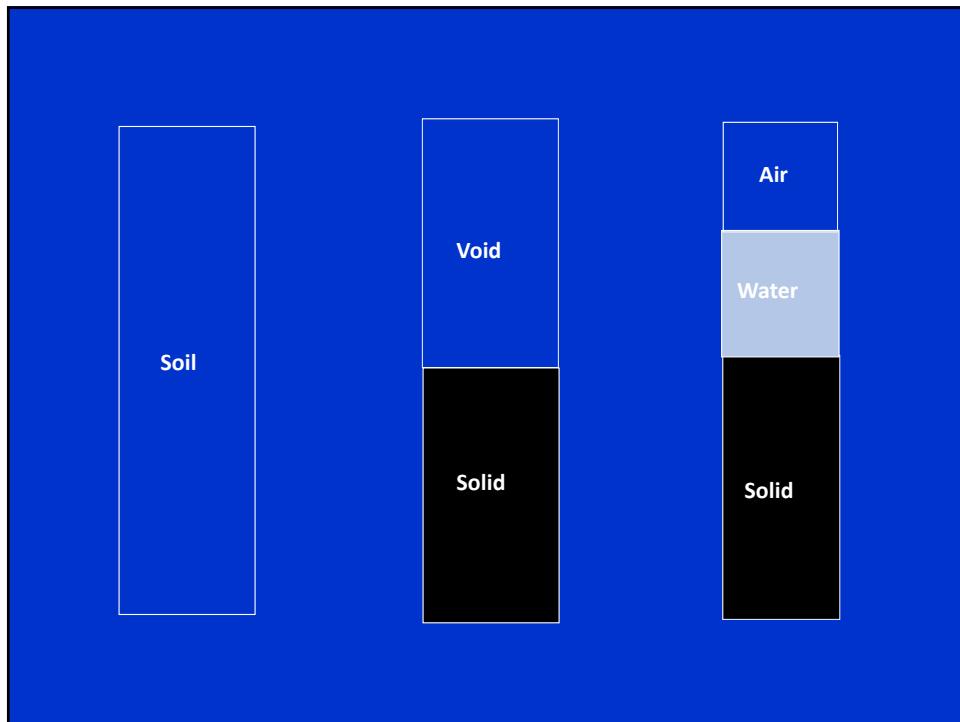
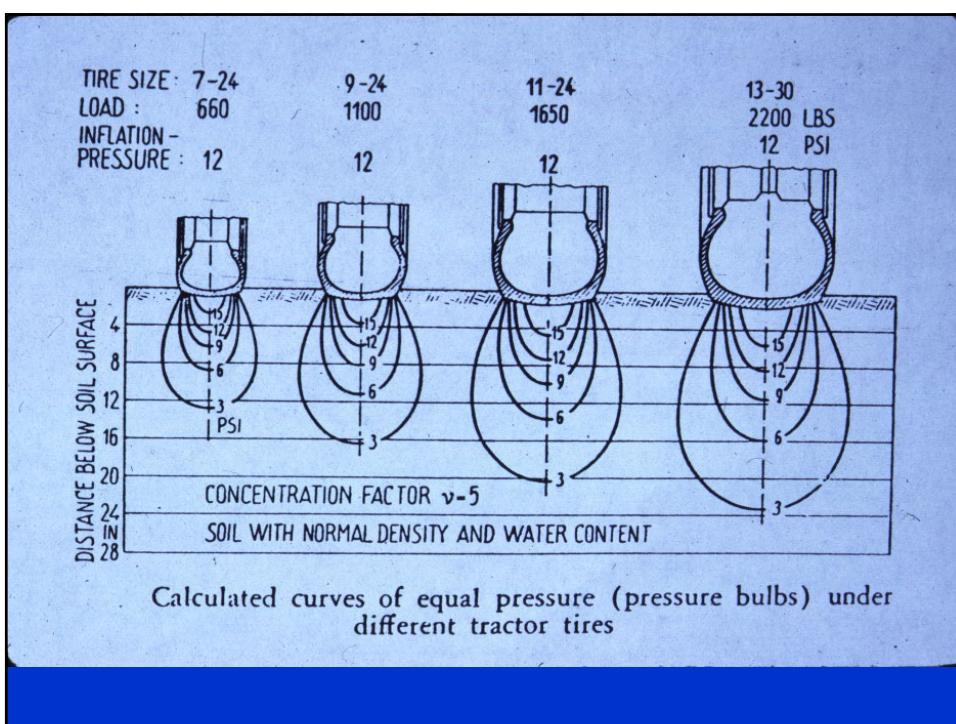
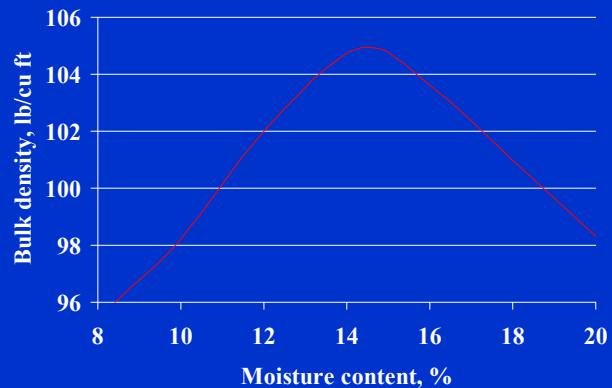


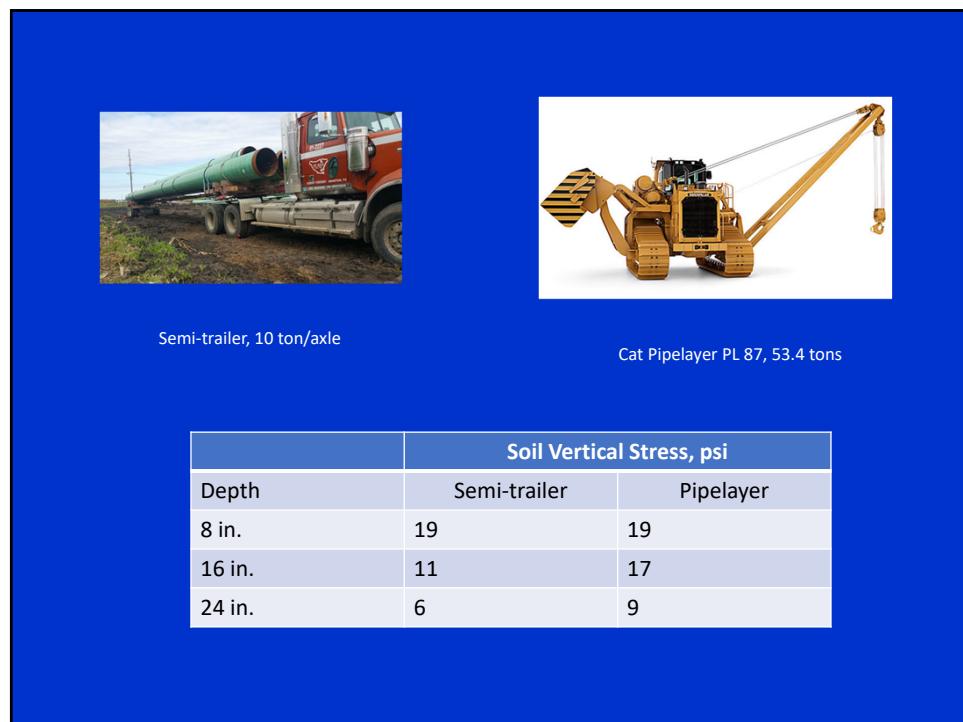
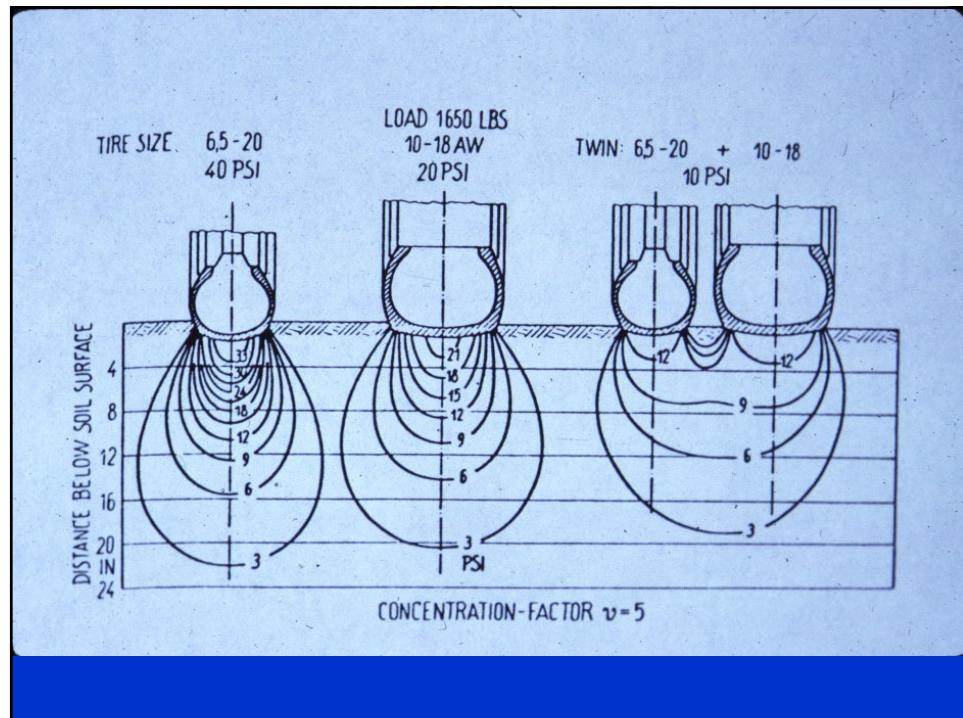
## Dealing with Soil Compaction Considering Equipment of Today

Mark Hanna  
Ext. Ag Engineer  
Iowa State University  
(retired)









“Soil compaction, which is aggravated by harvesting in the mud, is a growing concern of some farmers. Research shows that loads of 5 tons per axle can cause deep compaction that’s not alleviated by freezing and thawing or readily removed by subsoiling. . . . Big grain carts can also compact soil. . . . In extreme cases, farmers may have to decide whether a current crop in a wet field is worth more than the cost of battling mud and possibly reducing future yields by increasing compaction.”

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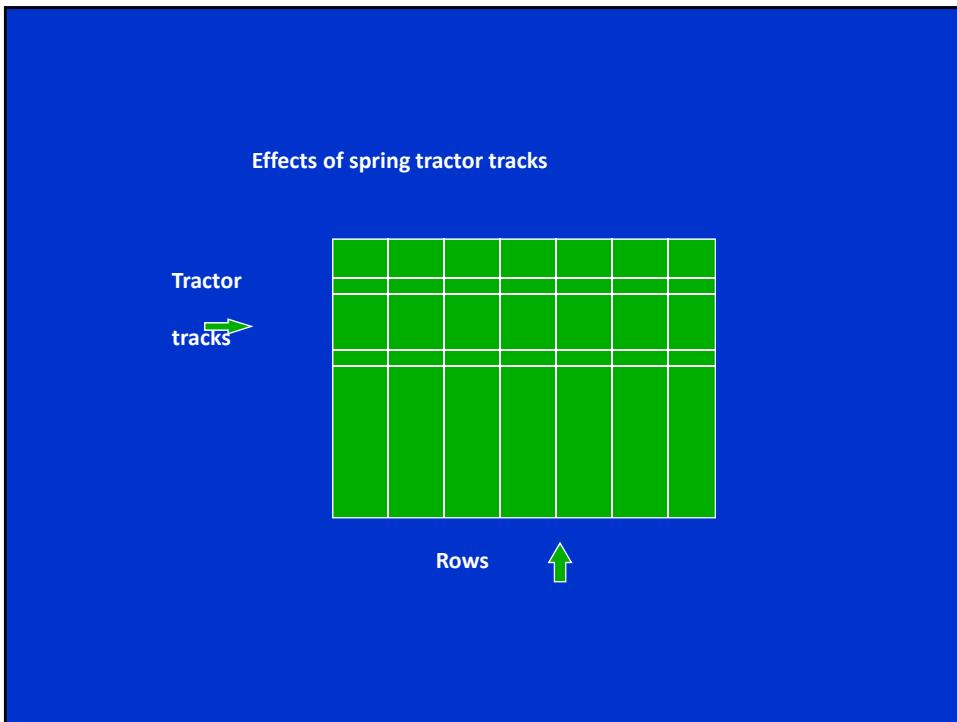
- *Grain harvesting in the 1990's, Implement & Tractor, July 1988, Frank Buckingham*

Agricultural axle weights

Combine w/300 bu  
Manure tank wagon  
Grain cart w/1200 bu  
Tractor, 330 hp, FWA

Agricultural axle weights

	<u>Per axle</u>
Combine w/300 bu (front axle)	24 tons
Manure tank wagon	18
Grain cart w/1200 bu (single axle)	46
Tractor, 330 hp, FWA (rear axle)	12



Tracks effect on corn		
Location	Pop/a	Yield, bu/a
Tractor track	22,700	143
Non-track	23,500	166
Track	23,600	148
Wheel	22,200	139

Erbach et al., 1988  
4 year average, '84-'87  
Continuous corn

**Track Position Effect on Corn Growth**

Location	Yield, bu/a
<b>No tracks</b>	<b>157</b>
<b>Single-track, one side</b>	<b>154</b>
<b>Double-tracks, one side</b>	<b>150</b>
<b>Tracks on both sides</b>	<b>157</b>
<b>Track on-row &amp; both sides</b>	<b>121</b>

3 year average, '93-'95  
 Webster silty clay loam  
 Kanawha, IA  
 Corn-soybean

Kaspar and Erbach, 1996

**Compaction and subsoiling, central and southeast IA**

**In only 1 of 9 site-years of data did compaction from 10- or 20-ton axle loads show significant yield reduction**

**Subsoiling also generally did not affect yield, and in 2 of 3 cases reduced yield**

Melvin et al., 1994

**Compaction and subsoiling, northwest OH**

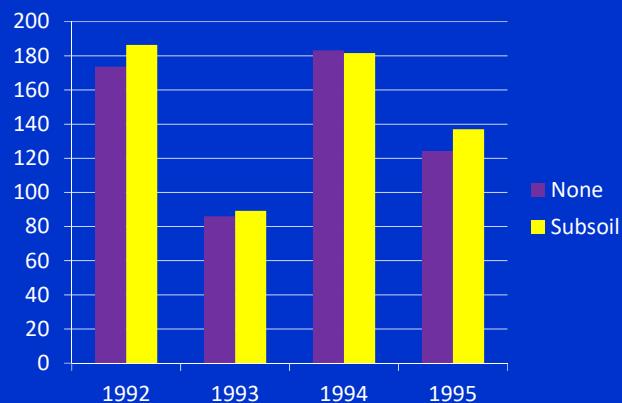
Corn and soybean yields were reduced 3 of 4 years during years with 10- and

20-ton axle loads applied

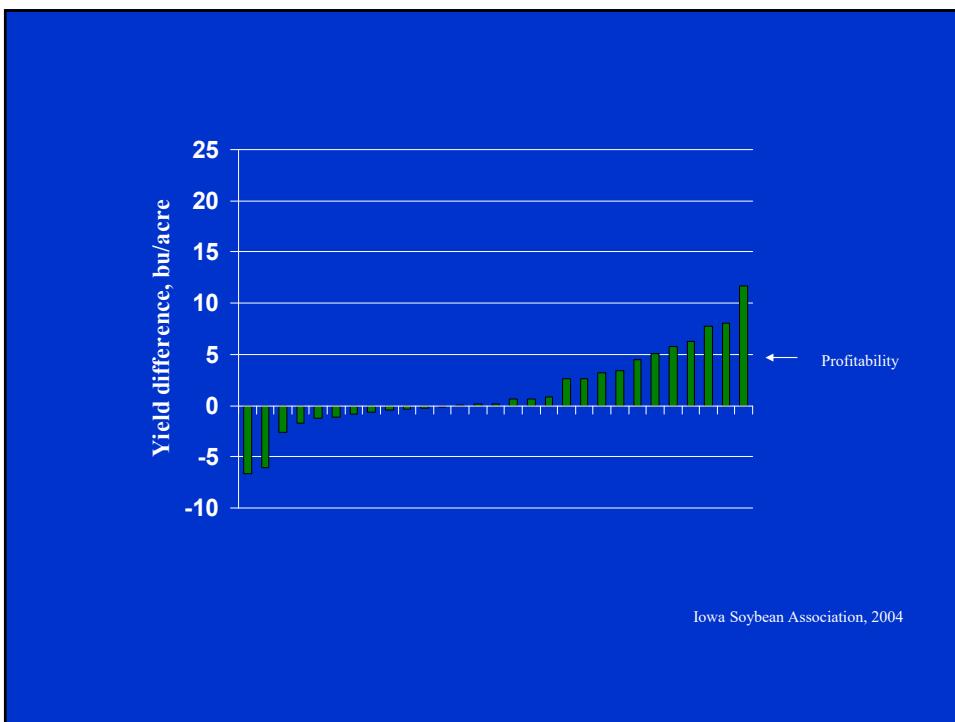
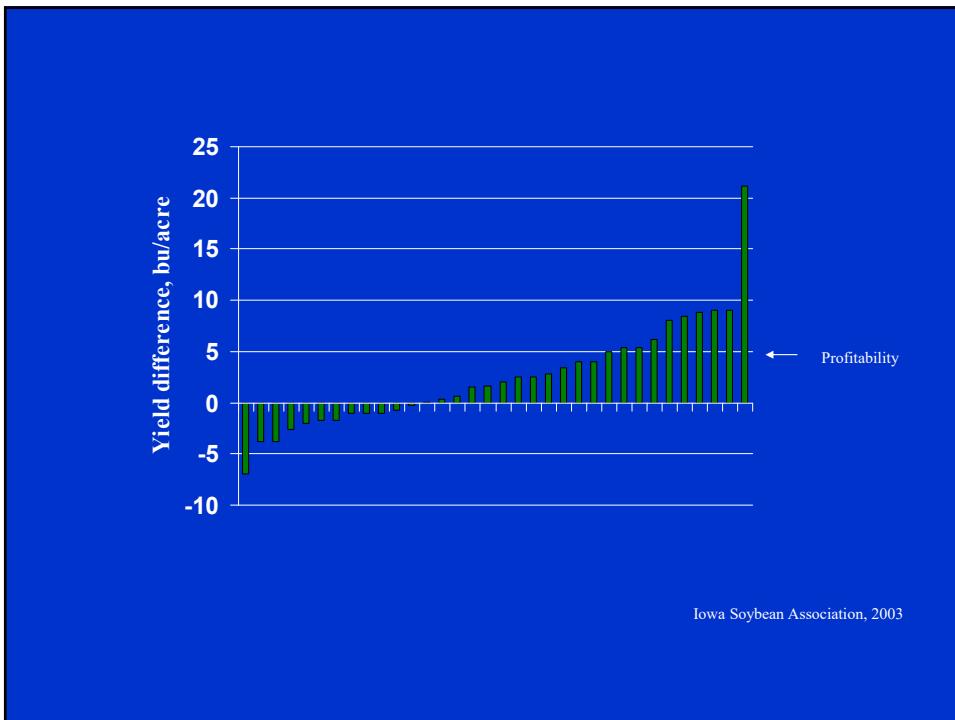
Residual effect on yield also present with 20-ton axle load for 1 year on corn  
and 3 years on soybeans

Subsoiling generally increased yields, although not always statistically significant

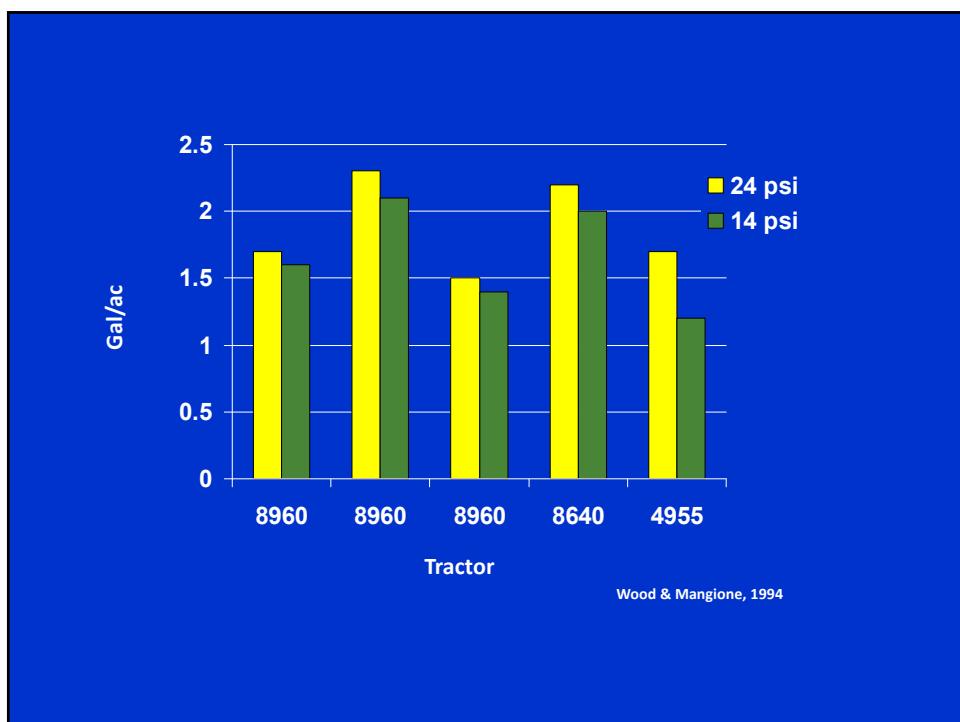
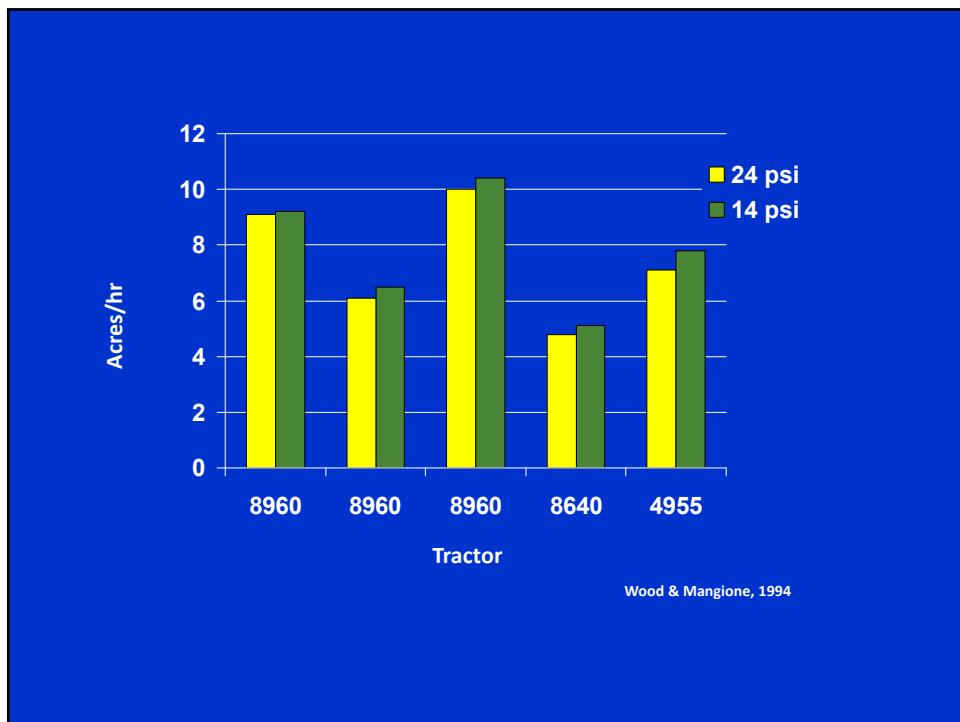
Al-Adawi and Reeder, 1996



Al-Adawi & Reeder, 1996







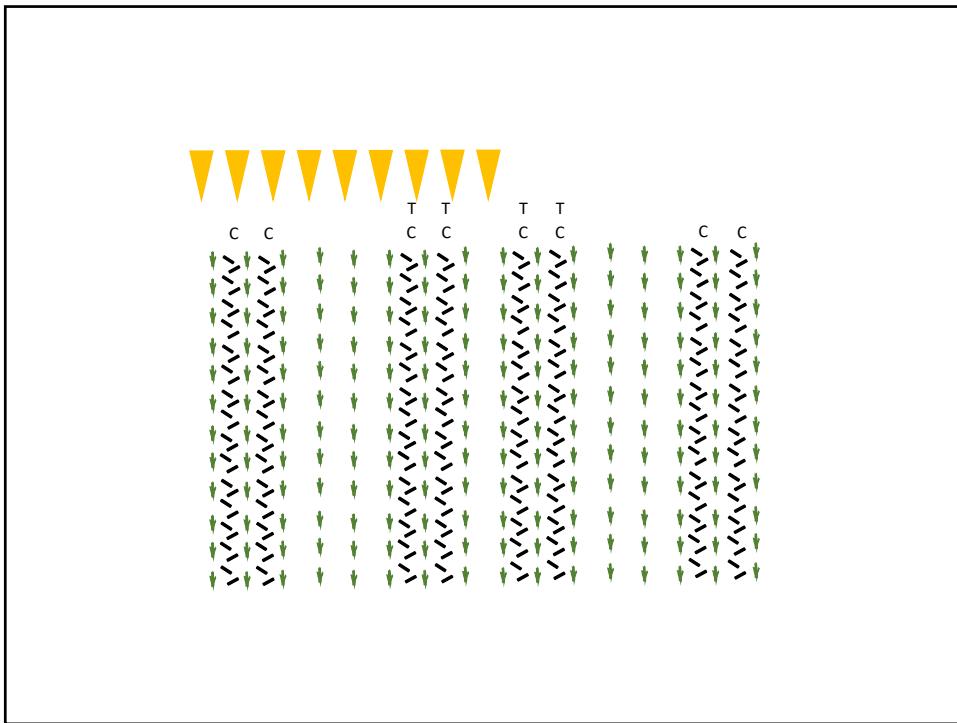
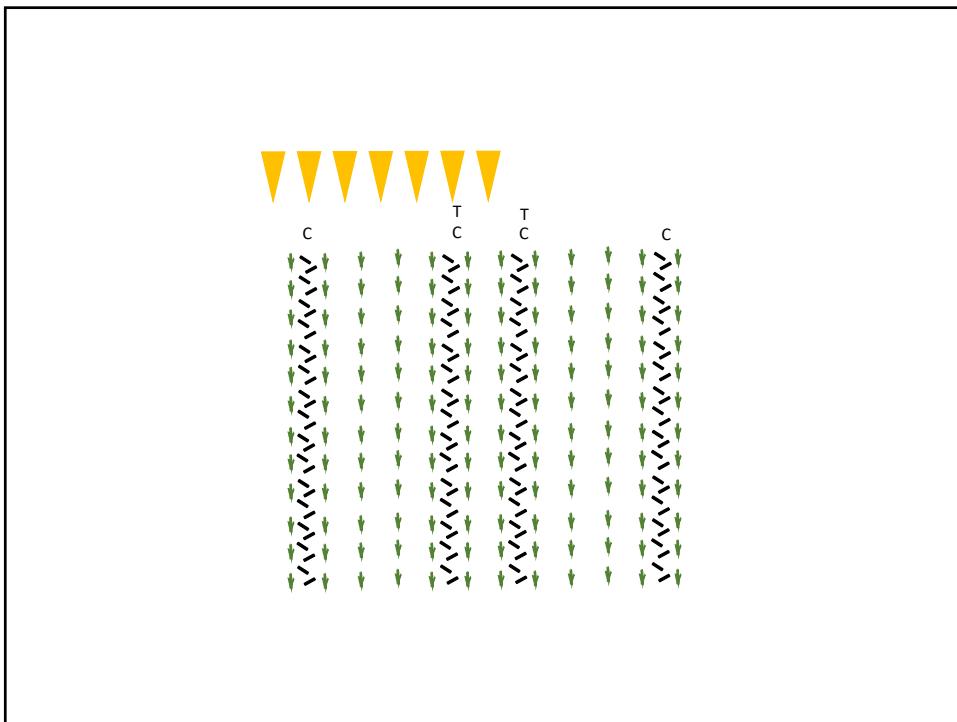


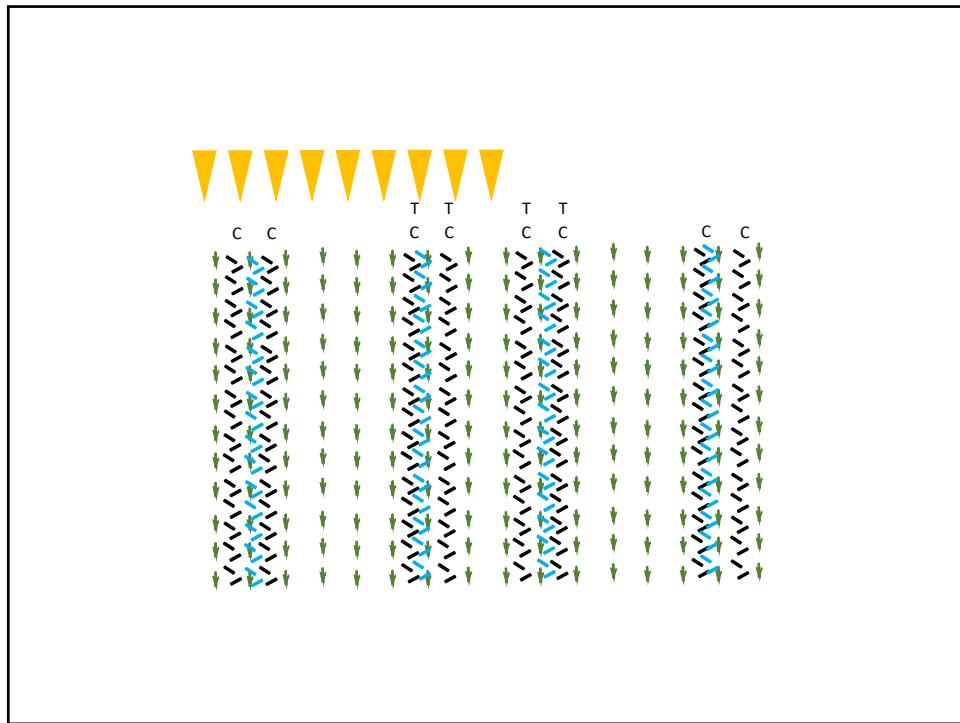
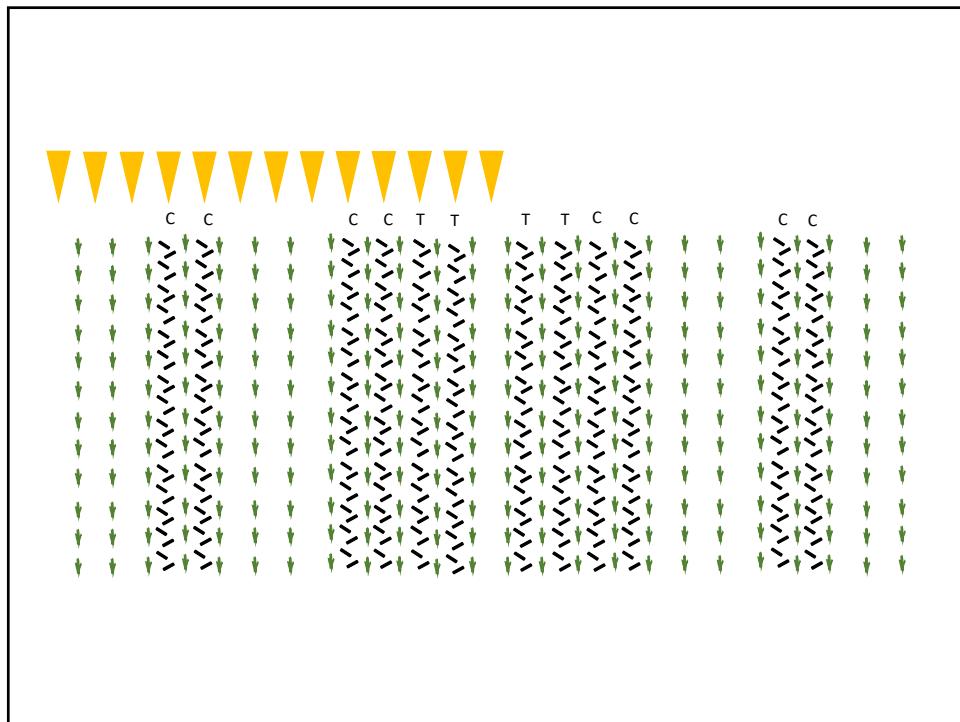
#### **Management tools**

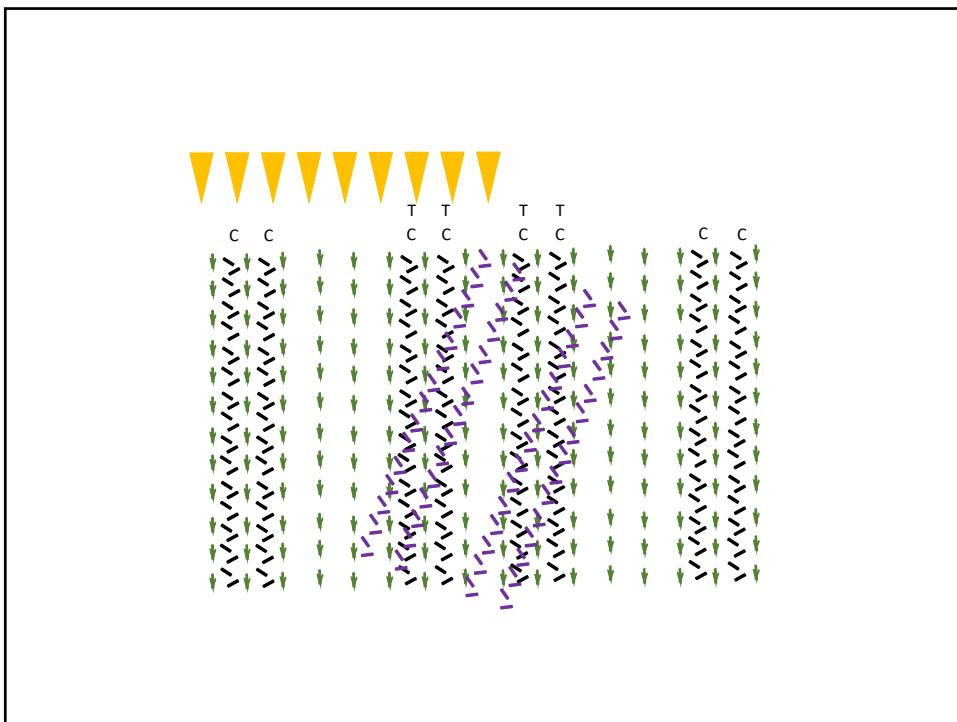
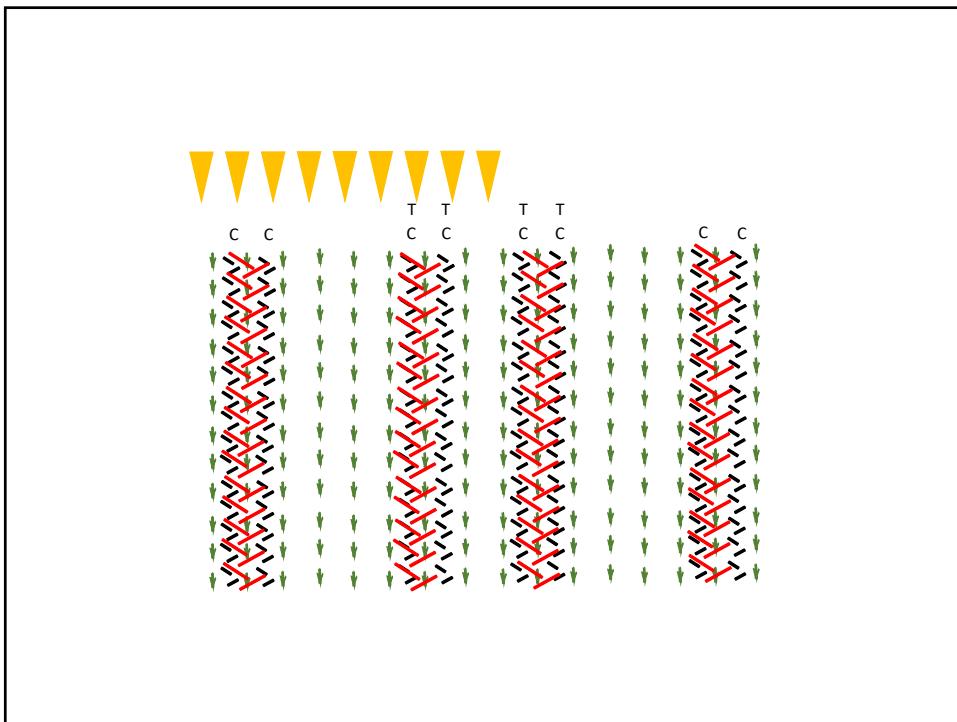
- Avoid trafficking wet soils
- Control traffic in established lanes
- Use correct tire pressure for load carried

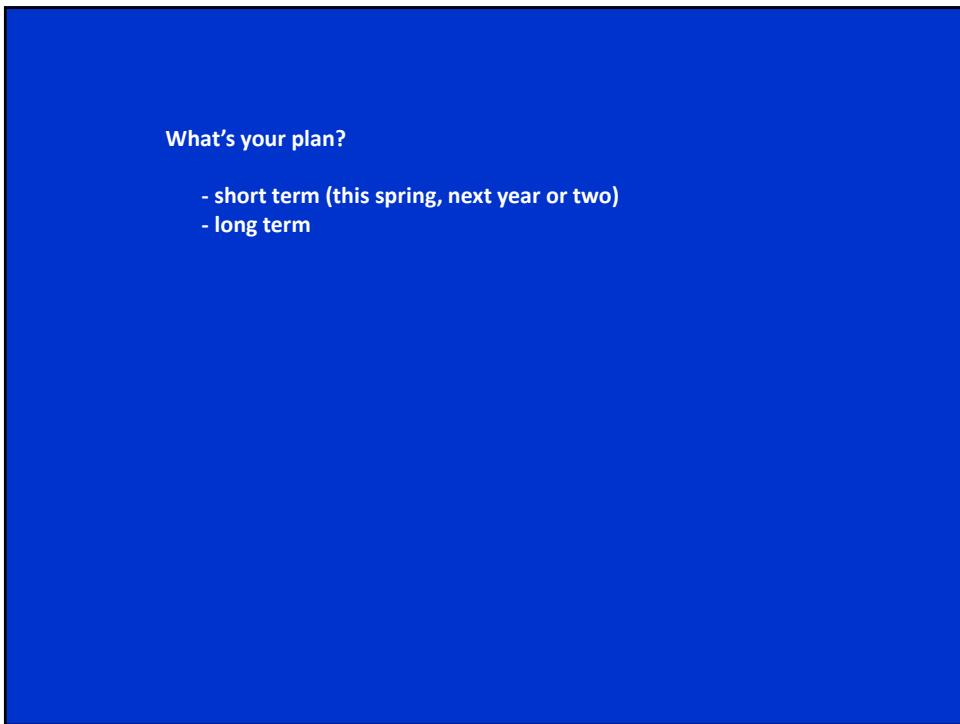
#### **Additional management tools**

- No-till or reduced tillage if wet spring planting season
- Grain cart paths in fall
- Controlled traffic considered during machine purchase









What's your plan?

- short term (*this spring, next year or two*)
- long term